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Neutrosophy in Artificial Intelligence: Advances and Applications from the Joint International Conferences of BARNA Management School (Dominican Republic) and Universidad del Trabajo del Uruguay (August 6–8, 2025)

Florentin Smarandache, Maikel Leyva-Vázquez and Mohamed Abdel Basset [3]

Dedicated to Themistocles M. Rassias on the occasion of his 75^{th} Birthday

We are delighted to present this special issue of our journal, dedicated to the advances and applications of neutrosophy in Artificial Intelligence. This volume is the result of a joint effort stemming from the conferences held between BARNA Management School of the Dominican Republic, the Universidad del Trabajo del Uruguay (UTU), and the Latin American Association of Neutrosophic Sciences. The conferences, held from August 6 to 8, 2025, were titled " Thinking in Uncertainty: Neutrosophy and Critical Thinking to Overcome the Limits of Artificial Intelligence."

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Opening session of the conference at BARNA Management School in Santo Domingo, Dominican Republic.

The event in Uruguay, which took place on August 6 in the Assembly Hall of UTU's headquarters in Montevideo, was a noteworthy day of reflection and an interactive workshop. This activity, organized by the General Directorate of Technical-Professional Education - UTU, was designed to disseminate this innovative field of knowledge among teachers, students, researchers, and the general public. The visit of the speakers not only aimed to enrich the academic debate but also to open a strategic window for forging lasting cooperation links.
The conference brought together internationally renowned researchers whose contributions enriched the discussions and deepened the collective understanding of neutrosophy. Their presentations offered participants a unique opportunity to explore the theoretical underpinnings of this emerging discipline —an innovative fusion of logic, mathematics, philosophy, and computational thinking—while also highlighting its practical implications across diverse domains.

Conference at UTU's Assembly Hall in Montevideo, Uruguay, with participation of authorities, faculty, students, and the general public

The philosophical and mathematical theory of neutrosophy, conceived by Dr. Florentin Smarandache in the 1990s, has transformed our approach to logic and reasoning. To classical logic, based on binary principles such as true/false or membership/non-membership, neutrosophy adds a third

fundamental component: indeterminacy. This new approach is not merely academic; it is an indispensable tool for navigating the complexity of the real world, characterized by uncertainty, ambiguity, and contradiction.

The relevance of neutrosophy is particularly noteworthy in the context of modern artificial intelligence. Even today's most advanced AI systems face significant difficulties when dealing with incomplete, contradictory, or unclear information. Large Language Models (LLMs), for example, operate by generating probable text from statistical patterns extracted from immense datasets. Their probabilistic nature can lead them to produce answers that, while statistically possible, may be factually or contextually incorrect. Juan Bosch, a Dominican writer and politician, eloquently stated: " It is a law of nature that there is nothing so good that it does not leave a sediment of something bad, nor anything so bad that it does not produce some good result." This observation perfectly captures the duality of technologies as powerful as AI.

Participants during the opening session at BARNA Management School, Santo Domingo, Dominican Republic, engaged in the conference activities.

Applying neutrosophic principles in artificial intelligence offers a robust framework to overcome these limitations. By explicitly including indeterminacy as a separate component, alongside truth and falsehood, neutrosophic systems can more faithfully model the complexity of human knowledge and decision- making in uncertain environments.

The articles in this special issue cover a wide range of practical applications. The meeting at BARNA Management School and the Universidad del Trabajo del Uruguay is more than a simple academic collaboration; it represents the convergence of different perspectives on the future of artificial

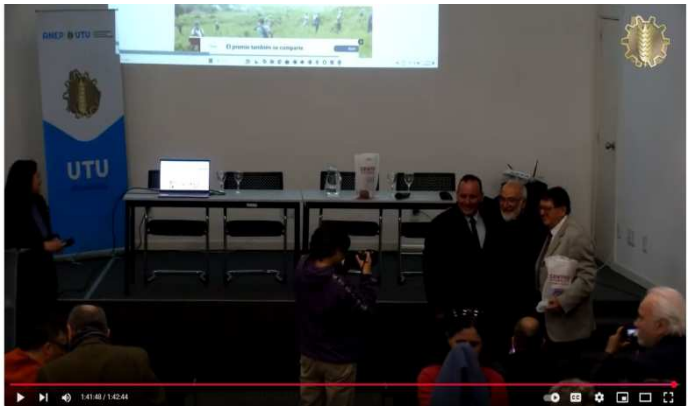
intelligence. UTU, with its focus on technical-vocational education, provides a practical and applied vision. BARNA, in turn, contributes its expertise in managing emerging technologies. This institutional synergy demonstrates the inherently interdisciplinary nature of neutrosophy and its potential in the field of AI.

Audience attending the conference at the Assembly Hall of the Universidad del Trabajo del Uruguay (UTU), Montevideo, actively engaging in the presentations.

The importance of this work transcends the purely technical. In an era where AI is redefining our ways of working and interacting, the ability to manage uncertainty becomes a crucial skill. The ” cognitive offloading paradox” shows how excessive reliance on technology can weaken our natural cognitive faculties, making it even more imperative to preserve and enhance our critical thinking skills as the world becomes more complex.

One of the venues of the event, the Instituto de Alta Especialización José F. Arias (IAE Montevideo – UTU), where academic sessions and meetings took place. On the far left, Dr. Manuel Enrique Puebla Martínez, a distinguished researcher and main organizer of the sessions in Uruguay.

Our unique competitive advantage over AI systems lies in critical thinking: the ability to analyze and judge the consistency of reasoning. José Martí masterfully expressed it: " To be a great logician is more important than to be a great gymnast, because logic teaches us to reason, reasoning leads to wisdom, and wisdom—Lord Bacon said—is power." This quote from the Cuban thinker resonates with special relevance today, when the ability to think logically and handle uncertainty is a fundamental competence for living in a world where human and artificial intelligence coexist.



Closing moments of the conference "left Pensar en la incertidumbre"right at the Assembly Hall of the Universidad del Trabajo del Uruguay (UTU), with speakers and attendees. Sections of the event were broadcast online and remain available at YouTube.

Current AI often provides one-dimensional answers based on the most common patterns in its training data. However, human perspectivism—the natural ability to consider multiple viewpoints simultaneously—allows us to integrate diverse cultural, historical, and personal perspectives in ways that current AI systems cannot replicate without explicit guidance. Contextual understanding is another area where human thought remains far superior. Understanding how meaning changes according to cultural, historical, social, or situational factors requires a deep interpretive skill that AI systems cannot currently process adequately with implicit contextual information.

Karina Pérez Teruel, PhD, professor at BARNA Management School, one of the organizers and a prominent neutrosophic researcher

This special issue also addresses the broader implications of the fusion between neutrosophy and AI. The rapid growth in publications on neutrosophy, especially in AI applications, shows that the scientific community is recognizing the importance of having conceptual frameworks that can handle indeterminacy in a rigorous and systematic way.

Dr. Florentin Smarandache, creator of neutrosophy, attending the conference at the Assembly Hall of the Universidad del Trabajo del Uruguay (UTU).

His participation provided an invaluable perspective on the origins, theoretical foundations, and applications of neutrosophy.

Plithogeny, a generalization that addresses degrees of membership for multiple attributes, further expands the complexity and utility of these ideas. The combination of emerging technologies like blockchain, quantum computing, and autonomous systems with existing ones could open new avenues for managing indeterminacy in high-tech environments.
The Latin American perspective adds a unique dimension to this conversation. The indigenous cultures of the Quechua, Aymara, Maya, and Guaraní have developed concepts such as relationality (the ayni principle), complementary duality (yanantin), and ontological indeterminacy, which bear a strong resemblance to neutrosophic ideas. The principle In Lak'ech – Hala Ken (" I am another you, you are another me") is a relational ethic that transcends Western binary thinking and offers valuable insights for creating more open and context- aware AI systems.

Dr. Florentin Smarandache, creator of neutrosophy, delivering his presentation on the theoretical foundations and interdisciplinary applications of the discipline during the conference at the Assembly Hall of the Universidad del Trabajo del Uruguay (UTU).

The articles in this special issue are novel and original works that advance the theory and practice of neutrosophy applied to artificial intelligence. Each contribution has been rigorously reviewed by expert peers in the field. We hope this Special Issue will inspire future research and collaboration between

neutrosophy and artificial intelligence.

Today's challenges, such as climate change and digital transformation, are too complex for simplistic ideas.

We need conceptual frameworks that can address uncertainty intelligently and with nuance. Neutrosophy offers a useful path for thinking about these problems, as it can integrate truth, falsehood, and uncertainty into a single framework.

Finally, we are aware that the future of artificial intelligence lies not in replacing human intelligence, but in the symbiosis between artificial systems and human capabilities to mutually enhance each other.

Neutrosophy provides us with a framework for thinking about this collaboration by clarifying the strengths and weaknesses of each type of intelligence.

The event was covered by the press and shared widely on social media.

Mario Benedetti, in his poem " No te rindas" (" Don't Give Up"), reminded us that " there is still fire in your soul, there is still life in your dreams."

In light of this special issue, these words serve as a reminder that, despite technological advances, human creativity, intuition, and the ability to find

meaning in uncertainty remain essential components of our quest for knowledge and understanding.

We invite our readers to explore the articles in this volume with an open mind and a critical spirit.

True wisdom is not about choosing between technology and humanity, but about finding the right balance where both can enrich each other.

Links to the consulted news and publications:

Administración Nacional de Educación Pública. (2025, August 12). UTU promoted a day of reflection on the challenges of Artificial Intelligence [Title translated from Spanish]. ANEP. https://www.anep.edu.uy/utu-promovio-jornada-de-reflexion-acerca-de-los-desafios-de-la-inteligencia-artificial

Diario Cambio. (2025, August 12). A day of reflection on artificial intelligence is held [Title translated from Spanish]. https://diariocambio.com.uy/2025/08/12/realizan-jornada-de-reflexion-sobre-la- inteligencia-artificial/

Ecos del Hum. (2025, August 12). Neutrosophy: An innovative proposal that invites thinking from philosophy [Title translated from Spanish]. https://ecosdelhum.com.uy/contenido/25032/neutrosofia-una-innovadora-propuesta-que-invita-a-pensar-desde-la-filosofia

Universidad del Trabajo del Uruguay. (2025, August 6). Thinking in uncertainty: Neutrosophy and Critical Thinking [Video]. YouTube. https://www.youtube.com/live/PuLrt-xJGuk

Universidad del Trabajo del Uruguay. (2025, August 12). A day of reflection and exchange on the challenges posed by Artificial Intelligence [Title translated from Spanish]. UTU. https://www.utu.edu.uy/jornada-de-reflexion-e-intercambio-ante-los-retos-que-nos-plantea-la-inteligencia-artificial/

Universidad del Trabajo del Uruguay. (2025, August 12). Neutrosophy: An innovative proposal that invites thinking from philosophy [Title translated from Spanish]. UTU.

https://www.utu.edu.uy/neutrosofia-una-innovadora-propuesta-que-invita-a-pensar-desde-la-filosofia/

University of New México,
Gallup Campus, USA

Universidad de Guayaquil (UG),
Ciudadela Universitaria,
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Faculty of Computers and Informatics,
Zagazig University, Egypt